Name: _____ **Date:** _____

Stellar Dynamics 12th Grade Orbital Quiz

Calculate orbital mechanics and analyze axial precession through diverse problem sets designed to bridge Newtonian physics with observational astronomy.

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1. Which astronomical phenomenon, occurring over a ~26,000-year cycle, is responsible for the gradual shift in the positions of constellations relative to the equinoxes?

A. Apsidal precession
B. Axial precession
C. Orbital eccentricity
D. Obliquity oscillation

2. The _____ limit refers to the minimum distance from a planet where a moon can remain intact without being shredded by tidal forces.

A. Schwarzschild
B. Chandrasekhar
C. Roche
D. Kuiper

3. During perihelion, the Earth is at its furthest point from the Sun, resulting in lower orbital velocities according to Kepler's Second Law.

A. True
B. False

4. Milankovitch cycles are used to model long-term climate changes on Earth. Which component of these cycles refers specifically to the shape of Earth's orbit around the sun?

A. Obliquity
B. Precession
C. Eccentricity
D. Insolation

5. The _____ point L1 is a position in space between the Earth and the Sun where gravitational forces allow an object to remain nearly stationary relative to them.

A. Lagrange
B. Barycenter
C. Apogee
D. Zenith

6. The sidereal day is approximately 4 minutes shorter than the solar day because the Earth must rotate slightly more than 360 degrees to realign with the Sun.

A. True

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B. False

7. What specifically causes the 'Analemma'—the figure-eight curve representing the Sun's position in the sky—when photographed at the same time throughout the year?

A. The Moon's libration and Earth's tides
B. Atmospheric refraction and seasonal heat
C. Axial tilt and orbital eccentricity
D. Solar flares and sunspot cycles

8. When the Moon is at _____, its furthest point from Earth, it appears smaller and can result in an annular solar eclipse rather than a total one.

A. Perigee
B. Apogee
C. Syzygy
D. Nadir

9. The Barycenter of the Earth-Moon system is located deep within the Earth's mantle, rather than at the exact geometric center of the Earth.

A. True
B. False

10. Which force is primarily responsible for the 'Tidal Bulge' found on the side of Earth opposite to the Moon?

A. The Moon's direct gravitational pull
B. Inertia (Centrifugal effect) from the system's rotation
C. Magnetic repulsion from the Earth's core
D. Solar wind pressure